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EDITORIAL.

THE REGULATION BY LAW OF THE PRACTICE OF VETERINARY MEDICINE IN THE STATE OF NEW YORK.—The need for it gradually felt for years—attempts and failures following each session of the Legislature—the cause—divisions in the ranks of the veterinarians—union is necessary for success—the two inimical societies at last act together—the result is the passage of a bill by the Legislature of 1886—the telegram sent to Dr. Pendry—the work of registration begins—the discovery—disappointment amongst almost all—the "liberals" do not object—the game of the postal card—terrible results of the mutilation of the bill—Hon. J. B. Shea, of the Assembly, comes to the rescue—his efforts in behalf of the profession—the amendment to the law—section 2 is no longer as it was—this time quackery is doomed—but veterinarians must watch. EFFECTS OF LIGHTNING ON HORSES.—The subject rather lightly treated in veterinary works—few cases on record, except the fatal ones—the case of Pancoast—his recovery slow but sure. GOVERNMENTAL AID TO FRENCH VETERINARY SCHOOLS.—The difference between the doings of European and American governments—shall we ever see similar action in the United States?

THE REGULATION BY LAW OF THE PRACTICE OF VETERINARY MEDICINE IN THE STATE OF NEW YORK.—The members of the veterinary profession in this State had been for years considering the low status maintained and the slow progress achieved by veterinary science in the estimation of the public, until at length they felt that the time had come to take a new departure, and make a vigorous effort to obtain the legal protection and government recognition without which the full establishment and further advance of its claims seemed impracticable. Movements were then initiated and steps taken looking to an appeal to the Legisla-

ture for the passage of laws for the regulation of veterinary practice in the State, by defining the qualifications and protecting the rights and interests of properly authenticated practitioners, and the discouragement or suppression of quackery and pretension.

These early attempts met only with discouragement and embarrassment. The annual presentation of their appeal was met by a yearly denial, and that some potent opposing forces were in operation became only too evident. Until these were discovered and neutralized, further effort seemed to be wasted labor.

Concerning one potent element of failure there could be no uncertainty. An obstructive discord existed among those who should have wrought as one man for a common good. The veterinarians of New York and Brooklyn, instead of forming a single community, united and co-operative, were divided into two bodies, having very similar names and entertaining very similar projects and intentions, but, without any good and tangible reason, occupying positions quite antagonistic and inimical towards each other. To obtain any such legislation as should be agreeable to both parties under such conditions was beyond all reasonable expectation. But at length wisdom dawned on their minds, and union being strength, a united movement was decided upon as the indispensable conditions of success. Then, after a series of palavers, the pros and cons were duly adjusted, and preliminaries of peace were signed. The younger association, as was proper, made the needful concessions to the elder, and with many protestations of friendship and of fraternal affection, the point of mutual consent was reached, and it was decided that another, and now a co-operative, appeal should be made to the law-making body. This was not unsuccessful, and accordingly the Legislature of 1886 passed the bill for which application had been made.

So in May of that year, a telegram was received by Dr. W. Pendry, announcing that "the veterinary bill has just been signed, and is now law." But though a feeling of satisfaction prevailed among many veterinarians, there were others who seem to have been affected by a feeling of apprehension and foreboding, as if influenced by the shadow of some impending trouble, vague but actual; and when the work of registration was entered upon

the revelation came. A discovery was made, and of a most disappointing character—the text of the Act had been garbled, mutilated, emasculated, and the entire essence of the law eliminated. It was a sad discovery.

The bill had been mutilated. Who was the culprit? When was the crime perpetrated? All the interrogative adverbs in the dictionary were employed, but a negative answer followed each. Instead of regulating the practice of veterinary medicine in the State, the law now thoroughly *un*regulated it; instead of protecting the qualified practitioner by proper conditions and restrictions against the charlatan and pretender, it practically protected the ignorant pretender against the trained scientist, and threw the field open to whosoever might feel a desire to occupy it.

If enthusiastic veterinarians, with the true interests of the science at heart, regretted the position, with its apparent reconciliations of discords and ostensible legal sanctions of the right and the true, there was still a small body of men in the profession who failed to unite in the impressions and feelings of the rest. These were the "liberal" ones, who were not fond of placing rigid restraints on others, nor of wearing them themselves. They would concede that in this matter some few requirements should be respected, and the law not too palpably violated. A few easy rules would be well enough, a few easy conditions formulated, such as would not be irksome, and could be justified without going far out of one's way. Thus if some poor fellow was known to practice without being registered,—a *postal card* notice would be sent to him; a *postal card* to make his equivocal position only the more public. He ought to take some pains to comply with the requirements of the law at least, by acknowledging the receipt of the postal card, and then it would be easy to "fix up" the non-registration matters. Freedom of registration; a grinding mill of certified credentials; easy going moderation—"long life to quackery!" which, it had been thought, had received a death blow. Thoughts like these are naturally suggested by a contemplation of the result of the law, as enacted in 1886, or rather, as signed by the Governor. The mutilation had done its work.

But this state of things could not become permanent, and the Honorable John B. Shea is entitled to the acknowledgments of the veterinarian fraternity for his efficient services in readjusting the disorder into which the matter had fallen. To this gentleman, and to the last Assembly in Albany, of which he was an honored member, the veterinary profession of the whole country owes much for accomplishing the perfecting of the amendment to the essentially worthless legislation of 1886.

Mr. Shea has by this step fully demonstrated his appreciation of the value of the services rendered by the veterinary profession to the country; of the requirements needed by its qualified members, and of the services which educated veterinarians are capable of rendering to the State, and his name must hereafter be closely associated with the elevation of the veterinary profession in the Empire State.

We print on another page the second section of the law of 1886, together with the amendment, as published. The duties which these enactments impose upon the profession of the State at large, and upon all veterinarians now registered, will be readily appreciated, and will also, we hope, be well remembered and promptly performed.

We urge our brethren to watch carefully lest the good we seem to have obtained be snatched from our hands. It is a matter of too much moment to be forgotten or set aside for smaller interests. It makes the qualified veterinarian the custodian of his own interests and honor. Let him not be unfaithful to himself.

The following presents Section 2 of the Law of 1886, and the amendment passed in 1888:

[Copy of Sec. 2 of the Law of 1886, regulating the practice of veterinary medicine.]

SEC. 2. No person shall be entitled to register as such practitioner unless he be a graduate of a legally chartered or incorporated college or university or shall hold a certificate of qualification from a legally incorporated veterinary society, except as provided for in Section 3 of this Act.

The amendment and the good law:

CHAPTER 431.

AN ACT TO AMEND CHAPTER THREE HUNDRED AND THIRTEEN OF THE LAWS OF EIGHTEEN HUNDRED AND EIGHTY-SIX, ENTITLED "AN ACT TO REGULATE THE

PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF NEW YORK."

Approved by the Governor, May 27, 1888. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section two of chapter three hundred and thirteen of the laws of eighteen hundred and eighty-six, entitled "An Act to regulate the practice of veterinary medicine and surgery in the State of New York," is hereby amended so as to read as follows:

§ 2. No person shall be entitled to register as such practitioner unless he be a graduate of a legally chartered or incorporated veterinary college or university, or shall hold a certificate of qualification issued previous to the passage of this Act, from a legally incorporated veterinary society, except as provided for in Section three of this Act.

STATE OF NEW YORK, Office of the Secretary of State, } *ss.:*

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom and of the whole of said original law.

FREDERICK COOK.
Secretary of State.

EFFECTS OF LIGHTNING ON HORSES.—The meagreness of our recorded information on the subject of the non-fatal effects of lightning upon animals has been a source of not a little regret among veterinarians, and new and reliable reports of recent cases will possess all the greater interest, as they tend to remedy this long felt imperfection.

Records are not lacking of the deadly effects of the lightning stroke, and there are sufficiently numerous reports of the simultaneous and instant destruction of large numbers of cattle and of sheep. But our search for well-conducted observations of cases in which the traumatic effect of the electric shock has fallen short of the destruction of life, has been in only a few instances rewarded with success. Whether this is to be accounted for by the fact—if it be such—that in animals sudden death is the usual effect of a stroke of lightning, we are not in a position accurately to determine, though perhaps the circumstance of the greater exposure of animals in consequence of their usual unprotected condition out of doors, in the field or the road, will go far towards suggesting the truth of the matter. But, again, why should not the simpler and milder

class of manifestations of injury by lightning, so often observed in the human sufferer, be witnessed in animals as well?

The case described in the present number of the REVIEW must, for a variety of reasons, prove to be of unusual interest to the professional reader, since, besides the fact of the great money value and "professional" renown, in his own sphere, of the "individual" patient whose case is involved, it also describes a case of injuries incurred while enjoying indoor shelter, and thus affords us an opportunity of presenting the student with such a detail of symptoms and manifestations as greatly to facilitate a comparison between the phenomena occurring under similar conditions in the human and the animal subjects respectively.

GOVERNMENTAL AID TO FRENCH VETERINARY SCHOOLS.—From the budget of the Minister of Agriculture we learn that the support given by France in the direction of veterinary education per annum is as follows: For the staff of the veterinary schools, 432,800 francs ($86,560); material for these schools, 566,000 francs ($113,200); making a total of nearly $200,000. Add to this 157,800 francs ($31,560) for the suppression of cattle diseases, and 460,000 francs ($92,000) as indemnity for the slaughter of diseased or exposed animals, and we have an aggregate of about $323,560 as the entire cost to the Republic of the regulation of veterinary matters.

Whether all this expenditure is wisely made will be widely questioned. The policy of government subsidies is popular only in this country amongst those who profit by the subsidies, and he will be a very old man who lives long enough in our Republic to see Congress voting money to pay the expenses of individual citizens in acquiring an education which is to fit them to obtain a livelihood in any civic business or profession, whether as teacher or learner.

We would not intimate that the veterinary profession is any too liberally treated and respectfully regarded by our governing powers, State or National, but we are not prepared to ask for payment from the public treasury of the salaries of our college professors or for the equine cadavers used up in anatomical demonstrations.

But they think differently in France, where the priest in the church and the singer and dancer in the opera, alike with the staff in the college, look for their salaries to the State exchequer box.

ORIGINAL ARTICLES.

RECENT WORK IN VETERINARY BACTERIOLOGY AND PATHOLOGY.

By Wm. T. Gottheil.

Perhaps the most important recent work in the domain of veterinary pathology is that of Prof. Th. Kitt on the mykofibromata of the horse and its relation to the micrococcus ascoformaus. A condensed account of the results of his researches may be of interest.

The malady is not uncommon in the horse, and is seen also in the sheep and goat. The tumors vary much in size and number, and whilst in the first named animal the inflammation always causes the formation of a small-celled new growth, a true granuloma, in the others the process usually goes on to acute inflammation and abcess formation.

Under the name of mykodesemoid (Johne), the affection is now well recognized by veterinarians.

Bollinger first demonstrated the specific organism in 1870, finding them in nodules in the lungs of a horse affected with the disease. He considered them, however, to be fungi, and from the manner of their aggregation designated them zooglea pulmonis equi.

Later, Professor Johne, of Dresden, during his investigation of chronic spermatic funiculitis in the horse, noticed that the tumors (the so-called champignons) which sometimes appear after castration, were evidently of infectious origin. They are met with somewhat frequently under the aspect of a chronic funiculitis, and are characterized by the appearance of fibromatous

masses, which finally soften and become purulent or necrotic. In these cases he found very large fibrous new growths, the contents of which were greyish-red and soft, and in places purulent.

In all of them he found a fungus exactly similar to actinomyces bovis; in the others the fungus was slightly altered in appearance by what he regarded as a degenerative process. He therefore designated the malady funiculitis actinomycotia.

In another later case of Johne's there was a fibrous growth, the size of a man's head, involving both cords. Here he found not actinomyces, but a micrococcus in encapsulated, zooglea-like groups, similar in many respects to the ascococcus Bilrothi. Still later he has published four more cases of mycotic funiculitis.

Johne also found a fibroid-like tumor, the size of a man's head, upon the heart of a 14-year old horse. This was a true mykodesmoid, and in it Johne found abundant colonies of a micrococcus similar to the one obtained from the funicular tumors.

Up to 1886 Johne has demonstrated the micro-organism in ten further cases of funicular tumor, and has finally designated it as "micrococcus ascoformans" (capsule-forming micrococcus).

During the years from 1881 to 1885 Rabe had independently found the same organism in a number of cases of mykodesmoid, had made pure cultures, and had produced similar tumors by inoculation. He regarded a traumatism as a necessary condition for invasion by the parasite, and proved its occurrence in all his cases. He proved a perfectly constant and typical form of growth in various culture media. Inoculations killed guinea-pigs by septicæmia, caused an inflammatory œdema in sheep and goats, ending in localized necrosis of the skin or more extensive necrosis of that organ and death of the animal. In horses the inoculation of a pure culture caused at first an inflammatory œdema, which disappeared in eight to ten days. But four to six weeks later there appeared at the spot a slowly growing fibrous tumor, and this tumor always contained the pathogenic micrococcus in large quantities. Vaccination in this way gave no immunity against subsequent growths.

Although the organism he found was exactly similar to that of Johne, he unfortunately called it micrococcus botryogenes.

The occurrence of mycotic granulation tumors containing the micrococcus ascoformaus have since then been noted by a number of observers—Bang, C. O. Jensen, Lindquist, Della Cace, Vigezzi (tumor weighed 60 kilos.), and others.

The presence of the micro-organism in question has been proven by Kitt in a case of funiculitis in the horse.

For further description of the micro-parasite, the reader is referred to Kitt's article in the "Centralblatt für Bacteriologie u. Parasitenkunde," Vol. III., Nos. 6, 7 and 8.

Nocard and Mollereau have lately reported a chronic contagious mammitis occurring in milch cows, differing both pathologically and etiologically from the well-known inflammatory affection of the mammæ. The milk diminishes in quantity, becomes sour, slimy, and finally stinking, and the animal has to be killed. In the milk itself are found long chains of streptococci.

Nocard and Mollereau made pure cultures of the organism, and inoculated them upon cows and goats, producing the same disease, thus demonstrating absolutely the etiology of the malady. They could not find that the use of the milk had any hurtful influence upon young dogs or rabbits, nor could they inoculate the streptococcus upon any other animal than the cow.

The malady is undoubtedly transmitted from one animal to the other by the hand of the milker.

Washing all the parts with 3 per cent. carbolic acid solution is recommended for prophylaxis. For treatment they employ the injection of a 4 per cent. boracic acid solution into the milk channel of the affected gland.

Renewed interest has lately been awakened in regard to the causation of carcinoma and sarcoma. As is well known, the only theory that in any way attempted to explain their occurrence was extremely unsatisfactory. Cohnheim's theory, briefly stated, was that the cancer cells are simply embryonal connective tissue or epithelial cells, left over, as it were, from the original blastoder-

mic layers, and possessed of all the qualities of rapid atypical growth which characterize cancer cells as well as embryonal cells. Why such cells should remain quiescent for half a century, and suddenly spring into vigorous life—that, as well as many other points, the theory left in the dark.

The feeling has of late years been gaining ground that the malignant new growths must be of parasitic origin; that no other theory will explain their occurrence. A number of investigators —Ballance and Shattuck, in England; Scheurlen and Schill, in Germany; Freire, in Brazil; and Rappin, in France, have busied themselves especially with the subject. Their results, however, are as yet decidedly divergent and inconclusive.

Without going deeply into their experiments, we can summarize the results obtained as follows:

Rappin's experiments were valueless. The diplococcus that he thought he found was found also in cultures made from healthy tissues.

Ballance and Shattuck worked more carefully, and with a great number of cases. Their culture experiments, on the whole, gave negative results; only a small proportion of their specimens gave them micro-organic cultures. Nearly ninety tumors, in all, were used. Nevertheless, the experimenters still hold to the parasitic theory as the most probable one to explain malignant new growths.

Scheurlen experimented with ten carcinomata of the breast. He found oval, greenish, shining bodies, which he called the spores of the carcinoma bacilli. The bacilli themselves could rarely be seen. He claims to have been successful in his cultures, and to have obtained bacilli containing oval, greenish, shining spores, identical with those obtained from the juices of the tissue itself. Inoculation experiments on dogs, etc., were, to say the least, inconclusive.

Scheurlen's researches have convinced a few competent judges, but the great majority believe his claim to have discovered the etiological factor of carcinoma to be premature. It is concerning the real nature of Scheurlen's spores and bacilli that investigators are now busying themselves.

Schill also has claimed to be able to demonstrate, by a modification of the Gram method, the presence in carcinomata of staff-shaped organisms which color only at the poles. His experiments are not yet completed.

Domingos Freire, of Rio de Janeiro, now claims that the objects shown by Scheurlen are identical with those already demonstrated by himself as the cause of carcinoma.

We may hope shortly to obtain some definite proof or disproof of these conflicting experiments.

E. Klein has been investigating an epidemic of foot-and-mouth disease in Bedfordshire. He obtained a micrococcus, which he cultivated, but could not inoculate. But on feeding four sheep with infected fodder, two developed typical disease of the feet, though mouth and general condition remained normal. One of these animals recovered after several weeks of sickness; the other was killed on the fifth day of its sickness. The internal organs were found normal, save for hæmorrhagic spots on the spleen. But in the vesicles and ulcers of the feet, micrococci similar to those obtained before were found and cultivated.

Fourteen guinea-pigs were fed with infected food; three died, one was killed and found normal. In those that died no characteristic lesions were found, but in two chain-cocci were found in the blood, and in one the pus of an abscess. Inoculations with pus and blood were negative.

The author believes he has discovered in this micrococcus the etiological factor of the disease.

Since animals that had been inoculated remained entirely unhurt when fed with infected material, Klein believes that he can obtain a protective virus by cultivating the chain-cocci found in the vesicles. These inoculations do not disturb the general health. He draws no absolute conclusions, however, pending some experiments on cattle now under way.

EFFECTS OF LIGHTNING ON HORSES.

STALLION PANCOAST PARALYZED—RECOVERY.

By A. Liautard, M.D., V.M.

A violent thunder storm broke over Parkville, L. I., and its vicinity, between nine and ten o'clock on the evening of Friday, the 15th of June ult., which was characterized by an unusual amount of electric disturbance, especially noticeable in the neighborhood of the breeding establishment of Mr. Shultz in that village. In this place was a special pavilion containing two large and well-fitted box stalls for the accommodation of two valuable stallions, Cuyler and the celebrated Pancoast. During the storm this building was struck by the lightning, the current entering the stable of Cuyler through the window, and crossing from thence obliquely over to that of Pancoast. But while passing towards the door it encountered an iron hook, and being reflected, as it seemed, in the same direction, had made its exit a few inches from the window at which it had entered. The stallion Cuyler remained unhurt. The men employed in the stable, who were at this moment some two hundred yards distant, hurried to the stable of Pancoast, which they found in flames, the bedding, blankets and other objects already burning. The fire being extinguished, the horse was found prostrate, having been knocked down by the shock. He was lying "in a heap" on his off side, with profuse epistaxis from both nostrils. He was at once well rubbed over the entire body with liniments, and in a couple of hours became able, though not until after two unsuccessful attempts, to regain his feet, though requiring for this the assistance of twelve men.

Dr. Ashe, of Brooklyn, the attending veterinarian of the establishment, then arrived, and to him I am indebted for the history of the case previous to the day of my own visit.

When the Doctor reached the place the horse was on his feet, and he remained in that position for ten or fifteen minutes, wearing a drowsy look, but while being rubbed dry, again went down. The effort to keep his feet caused a shaking of the entire

body, and he staggered to such a degree that artificial assistance and bracing were necessary to enable him to keep up in any case.

After going down the second time he remained on his bed for about an hour, breathing laboriously, and appearing to suffer great pain. His pulse changed from about sixty-five to seventy. Cold water was applied on the head during the night. He was also raised up, with much assistance, and a form of treatment prescribed, consisting of hot fomentations to his back and strychnia internally in grain doses every four hours. His pulse had subsided and he presented then the same appearance as when I first visited him, but in a greatly aggravated form. At that time he was unable to grasp or to masticate his food, although if it was forced into his mouth he would chew well enough on the right side, though the masticated ball would collect and lodge on the left, between the cheek and the teeth.

On the 16th, at 12 A. M., he was put in slings and rested well in them, and at 2 o'clock he micturated for the first time since he was injured, his urine being highly colored. He had before defecated in a normal manner. The same treatment was continued, the slings being removed in the evening.

On the 17th in the morning, the slings were again applied and continued on during the day, to be again removed at night. During the day he laid down for three hours, and rose again with but little assistance, that of but one man at his tail. The slings were put on again on the 18th and kept on, and on the 19th a stiff blister was applied over the poll, on each side of the median line. The warm fomentations on the back were discontinued, but the strychnia was continued. On the 20th, the slings were dispensed with altogether. The blister was again renewed on the 26th, and up to my visit on the 28th of June, the same internal treatment was persevered in, being followed with gradual, though slow improvement.

The following were the prevailing symptoms at the period of my visit, varying only from those which were present at the origin of the case by the diminished degree of their force and severity:

The animal was in a large box stall, and although he carried

his head slightly down, and appeared sleepy and drowsy, yet his general condition was favorable. Upon removing the mosquito net covering from his head, (placed there for protection from the flies), he appeared with his head slightly extended and carried to the left, with the tip of the nose turned slightly upwards and to the right. The right ear was well erected and moving quickly, the left lopping down, being somewhat scorched at the lower commissure of the concha, and showing at that point a little abrasion or cutaneous wound. The right eye was somewhat injected, but in normal order, but the left was partially closed by the droping of the upper lid, the globe being turned downwards and immovable, and the pupil widely dilated, with a well marked amaurosis. The upper lip seemed to be normal, but the left was somewhat paralyzed, the left portion of it and the left commissure hanging down. The general sensibility of the skin seemed to be somewhat diminished, pricking with a sharp pencil being scarcely noticed. While standing, his legs were kept somewhat apart as if in consciousness of his instability. When compelled to move, his debility became apparent, his weakness of motion suggesting a compound of the action of locomotor ataxia and general paralysis. There was no dragging of the toe, no knuckling, no lateral staggering; it was a general giving way. The loins were very sensitive and flexible, perhaps a little of this being due to the application of hot compresses, which had somewhat blistered the surface. He generally kept on his feet and went to sleep, and in his sleep or drowsiness would suddenly fall, lying still and resting for several hours and then getting up unassisted. He drank freely and his appetite was good, though he had much difficulty in grasping grass. His mode of prehension of his food was peculiar; he would take a large bite, filling his mouth, and chew it and then possibly let it drop, but only to take it up again. All the functions were otherwise perfect. His temperature, his pulse, his respiration, his digestion, etc., etc., seemed perfectly normal.

It was a well marked case of general paralysis, with a correspondence equally well marked between the lesions present and those which may be observed in the human subject in similar

cases, involving the loss of power in the extremities, and the injury to the cranial nerves, as seen in the lesions of the left eye and in the facial palsy.

The treatment which was suggested and adhered to by Dr. Ashe, has thus far authorized a confident expectation of ultimate recovery. This treatment has consisted in counter irritation over the poll and the loins, and nervous stimulants in small and repeated doses, with alteratives and diuretics. The galvanic current was also suggested, in case the paralytic symptoms should prove persistent, but no occasion for resorting to its application seemed to arise.

SHEEP DISEASES: THEIR CAUSES, NATURE AND PREVENTION.*

By Thomas Walley, M.R.C.V.S.

In considering this subject I shall, as far as is possible, avoid technicalities and shall compress my subject into as limited a space as is compatible with its intelligent consideration.

Beginning then at the foundation, I shall deal with the *physiology of animal life* so far as it has to do with the production and prevention of disease.

The blood is the life, and the source of the blood is the alimentary matter we ingest; and if the food does not contain all the elements—and the proportion of elements too—necessary to the formation of the vital fluid, life cannot be maintained.

Recognizing this important, this vital fact, I shall, in the first place, endeavor to make plain the nature of this source and supporter of life; and, in the second, how its vitality is to be preserved.

The blood *is not* a *formed*, it is a *formative* tissue; it is not a simple fluid, but a highly complex one, and like all complex matter, is very susceptible to the action of surrounding influences. It is made up of fluids and solids which bear a definite proportion to each other, and any departure, past moderate limits, from this correlation inevitably produces grave consequences.

*Transactions of the Highland and Agricultural Society of Scotland.

I do not wish you to imagine that the blood is every day and every hour the same; the opposite is the fact. Probably it is never the same for even consecutive minutes of time. Now its fluid elements are in excess, then its solids. One hour it contains more saline elements than are absolutely necessary to enable it to perform its function; another it is deficient in such elements. One minute its flesh-forming constituents predominate, the next its respiratory; but all the while a certain and necessary correlation is kept up. Cross the boundary line and health ceases to be maintained, nutrition becomes impaired, the vital elements of the cell elements of the body gain not their normal stimuli and support, and disease takes the place of health.

I have said that the blood is composed of fluids and solids. It will, perhaps, astonish a few when I say that the proportion of water in 1,000 parts of blood is between 800 and 900, but this water, large as the quantity appears to the uninitiated, is absolutely necessary to preserve its normal fluidity and to enable it to circulate freely through the great streams and little rivulets of the system. As well might the farmer attempt to irrigate his pastures with mud, as the heart and arteries to circulate the blood if its volume of water were materially diminished.

Not only is this water necessary for the purpose of facilitating the distribution of the blood, it performs the office of preserving the solubility of the materials necessary for the support of the system—of preserving, in other words, these materials in the condition in which they may be absorbed and assimilated; and in order to render this solution perfect it contains certain chemical substances of an alkaline nature which possess the property in themselves of dissolving, or, more accurately speaking, of holding in solution the albuminous and fibrinous substances (*colloids*) of which the flesh (muscle) is composed. Amongst the other chemical constituents of the blood we have soluble phosphatic salts, *i. e.*, phosphate of lime and magnesia, both absolutely necessary for the building up and nourishing of the bony frame and the nerve and brain tissues. Carbonaceous material, fats (*hydrocarbons*), and starch, sugar, etc., are also important elements of the blood serum, as by them the fatty tissues are supported, and

food for respiration and the production of heat by oxidation is supplied.

The so-called solids of the blood consist of little bodies, known as cells or corpuscles; and inasmuch as some of these are colorless, while others, when in bulk, are of a red color, they are distinguished respectively as white (leucocytes) and red cells. The former of these are the larger, and they are endowed with the power of motion in a limited degree and of actively altering their shape. The latter are much smaller and are practically devoid of the power of motion; they are believed to be the highest stage in the development of the white cells.

Both these bodies are absolutely necessary in the blood, and to the white cells is now ascribed a function which, until recently, was only suspected, viz., the function of destroying injurious organisms, such as the germs of disease—devouring them, in fact—and of removing dead matter from the tissues; they are the scavengers of the system, and are as voracious as jelly-fish, closing over the object of their attack and digesting it, or all of it that is capable of being digested, and ejecting the remainder into the blood stream. By their agency, too, the solid parts of the blood—even the red cells—are removed from the tissues when that fluid is poured out into them as the result of an injury or in consequence of disease. If, in other words, an individual is unfortunate enough to get a "black eye," these little bodies set to work and, by breaking up and removing the red cells, upon which the color of the bruise is dependent, they restore the damaged tissues to their original condition. Moreover, the white cells rush into the breach whenever a wound is inflicted, and not only preserve the exposed tissues from the action of injurious organisms, but supply all the means by which the breach is filled up.

The red cells have equally as important, and even more important, an office to fulfill. They are the means by which oxygen is carried to the tissues for the purpose of oxygenation or decarbonization. They are, in other words, the conveyancing media of the gas (oxygen) necessary for the purpose of burning up the excess of hydrocarbons and carbohydrates, thus getting rid, to a large extent, of effete and injurious material, and of keeping up

the animal heat. The actual agent by which their oxygen-conveying function is performed is iron, and it is upon this element also that the cells are mainly dependent for their red color. Deficiency of iron means deficiency in oxygen, and the blood assumes a dark color—becomes venous, instead of being a bright red or scarlet color, as in arterial blood.

The existence of a third corpuscle is now recognized by many physiologists, but to the character and functions of this I need not allude in detail, further than to say that it is believed to be the originator of the other cells; hence it was called by Hayem a *hæmatoblast*, or blood-former.

That the blood is possessed of vitality is shown by its power, on withdrawal from the vessels, of undergoing coagulation—a process brought about not by the existence, as was once supposed, of fibrin as fibrin in the blood, but by the action of a ferment upon two substances pre-existent in that fluid, known as *fibrinogen* and *fibrinoplastin*.

The second problem we have to consider *is the means by which the vitality of the blood is maintained.*

I have already said that the source of the blood is the alimentary matter we ingest or take into our stomach and bowels in the ordinary processes of eating and drinking, and again I repeat that in order for the preservation of the equilibrium in the different constituents of the blood, the ingested matter must contain all the elements, and that too in due proportion, necessary for their supply. In other words, the food must contain a due proportion of flesh-forming matter, of heat producers, of alkaline salts (potash and soda), iron, phosphorus or phosphoric acid, magnesia and lime; with a few other elements of a less important character, such as sulphur. Before considering the effects of improper alimentation in the direction of inducing diseased processes, it will be useful to glance briefly at the effects of adverse agencies on the blood itself. Looking at the blood in the light of its vast importance in the animal economy, it would seem at first sight that it ought to be a stable tissue. Nothing, however, is further from the truth than is such a supposition, as even quantitative deficiencies or excesses in its elements are sufficient to induce grave

changes, both structurally (histologically) and functionally (physiologically); thus, if water is deficient in quantity the blood becomes thick, its plasticity is increased and, as a consequence, there is a great tendency to stagnation (congestion). If water is superabundant, the colloids are held in an undue state of solution, the coloring matter is dissolved out of the red cells, and the walls of these little bodies may be actually broken up or disintegrated. Not only is this the case but, owing to the macerating process to which they are subjected, the white cells are injuriously acted upon, and the elements entering into the composition of the walls of the blood-vessels (particularly of the capillaries) become weakened and their vitality lowered, and they allow of the easy escape of serum into the tissues and cavities of the body, and thus we have produced *dropsies* (effusions). It is a well-known fact, too, that an excessive draught of cold water when the system is heated, will, particularly in man, determine an attack of *nettle-rash* solely by its effects on the blood and the glands; and more than this, repletion and congestion of important organs is frequently produced by similar causes.

The colloids (proteids) of the blood are absolutely necessary, not only for the building up of the muscular and other tissues, but for their ordinary repair, as well as for the restoration and repair of tissues destroyed or damaged by disease and injury; and any deficiency therein must be compensated—the compensation taking place at the expense of the tissues. The colloids are rapidly disintegrated or used up in all important diseases, especially fevers, hence the rapid emaciation (wasting) which is associated with and follows disease, and hence the value of giving albumen and fibrin in a readily assimilable form—as eggs and milk—in the treatment of fever.

Excessive using up of the proteid elements, means not only emaciation, it means arrested growth, general debility, dropsy and often permanent impairment of the general health; degraded proteids being passed out of the system as useless material by the kidneys and not again made use of.

Great excess in these matters tends to the production of congestions and inflammations—produces, in fact, the so-called inflammatory diathesis, or a tendency to inflammation.

The heat and force-producing elements, though existing only in very small proportion in normal blood, are vitally as necessary to the well-being of the system as are the proteids. If they are deficient and cannot be obtained from the food, they must be got from the tissues—especially the fat—and if they cannot be obtained at all, heat production ceases and life is extinguished.

Fat is the first to become absorbed and burnt up in wasting diseases, but it is followed, or perhaps sometimes preceded, by the consumption of the proteids.

Excess of carbonaceous elements in the form of fat produces debility and interferes with the vital activity of the cells of the body, as well as predisposes to stagnation. Moreover, if this excess is kept up, the cells of the tissues of important organs become firstly, infiltrated with fat; secondly, actually transformed into fat. Independently of carbonaceous matters being required for respiration and production of heat, fat constitutes the basis of muscle, and no animal can thrive or even live if deprived thereof. Such elements frequently save the more important proteids from oxidation or burning.

Of the salts of the blood it cannot be said that one is more important than another. *Chloride of sodium* (common salt) is probably the most necessary for the preservation of health, and its withdrawal, or its absence from the blood, is followed by the gravest consequences. Salt (sodium) is required not only for the blood, it is necessary to the formation of the gastric juice and of the bile and for the digestion of albumen; and of the fact of its presence in the blood I cannot give a better proof than that which may be obtained by tasting the perspiration or the tears. Nature cries out for it, as is shown in the wandering of the denizens of the wilderness in search of it, and it is provided for them in the form of "salt licks."

Excess of salt is highly injurious, interfering as it does with the skin glands, and with the blood, inducing important skin diseases—*e. g.*, scurvy in man and eczema in certain animals, particularly in dogs.

That *potash* is necessary is proved by the fact of its forming a constituent part of the material food of animals, viz., vegetables.

Deficiency in this salt means impaired tissue nutrition; excess of it means excessive fluidity of the blood, increased activity of the kidneys, by which it is excreted, and dropsies. If the excess persists, defibrination of the blood follows and important forms of skin eruption are produced; the kidneys too become organically deranged.

The phosphates are absolutely necessary for the building up and nourishment of the bones and teeth; and if they are not supplied in due quantity, the former become soft and thus you have produced the various forms of bone softening, such as *rickets* and a tendency to fractures, as is sometimes seen in pregnant mares. Moreover, the teeth are imperfectly or slowly developed, and when developed tend to decay, and thus you have the late dentition (cutting of teeth) common to animals reared on poor lands, and the cases of rotten teeth (caries) which are so often seen under similar conditions.

Phosphorus is a constituent of nerve matter, and neither can growth go on nor can the functions of the brain be performed without it; and it must be remembered that animals cannot make up for deficiency in phosphorus in their ordinary food in the same way as man does by eating fish.

But while phosphorus in due proportion is necessary and beneficial, not only it, but phosphates also, in my opinion, may become baneful. Physiologically we know that phosphorus possesses the property, if given in excess, of dissolving and breaking up the blood cells, of causing very rapid fatty degeneration of the coats of the blood-vessels and of such important organs as the liver and of degrading the colloids of the blood: as a result of this, we get spontaneous flowing out of the blood (hemorrhages) into the tissues, and the passing out of albumen and broken-up red cells, with their coloring matter, with the urine. Superphosphate of lime also possesses the same properties, as was well illustrated some years ago in the case of cattle depastured on land near Liverpool which had been recently topdressed with this agent; the case came under the observation of Mr. Welsby, F.R.C.V.S., West Derby.

Without iron no animal could exist for one moment, and small

though its quantity in proportion to the other elements of the blood, it yet performs a most important function, viz., the carrying of oxygen to the tissues; the effects of the withdrawal or non-assimilation of iron are quickly seen in the pale color (pallor) of the visible mucous membranes—as of the eye, nose and mouth; and in man, in the blanching of the skin. In all animals the effects of its loss are seen in the excessive rapidity of respiration for the purpose of compensating, by the quantity taken into the lungs, for the small quantity of oxygen which the blood cells are capable of carrying to the tissues.

It is now demonstrated also that iron acts as a stimulant to the liver.

An animal in whose body iron is deficient becomes comparatively bloodless, though its carcass may be laden with fat; it is said to be *anæmic*, and if this condition is pushed too far it dies.

Iron may exist in abundance, but by the influence of adverse agencies, such as the action of disease or disease germs, the red cells may be incapable of appropriating it; and thus, in the midst of plenty an animal may die of oxygen starvation. If iron is assimilated in superabundance, an opposite extreme is induced, viz., *excess of blood* (hyperæmia), and inflammations may result.

Not only phosphorus, but, as has recently been shown, a salt of potash (the chlorate) has the power of so changing the coloring matter of the blood as to render it useless and to cause it to be passed out by the kidneys, giving to the urine a peculiar but characteristic color. Carbonic acid renders the blood dark and displaces oxygen. Carbonic oxide heightens the color but brings about such a change in the condition of the iron as effectually to prevent re-oxidation; hence the primary and secondary effects of exposure to the gases given off in combustion or fires and hence the blood-stained urine we sometimes see passed by animals which have been exposed to the influence of those gases in burning stables and cowsheds.

Having described some of the characters of the blood, I will now consider the influence exerted upon it by the more important organs and functions of the body, viz., by digestion and assimilation, by oxidation and nutrition; by the liver, the bowels, the

mesenteric glands, the kidneys, the spleen, the lungs and the skin.

Digestion.—The first act of digestion is performed in the mouth, when food is broken up by the teeth and exposed to the action of the *saliva*, which secretion converts the starcy matter it contains into sugar by the action of a ferment (ptyalin). The process is most perfect in ruminants. The second act in digestion takes place in the stomach, where the acid secretion—gastric juice (succus gastricus)—dissolves mineral and other matters, while by the action of a second ferment (pepsin) albumen is rendered more soluble and converted into substances known as peptones. The third act in digestion is performed in the small bowels, where the food meets with the secretion of the pancreas (sweetbread), the pancreatic juice; and with the secretion of the liver, the bile. The bile also contains a ferment which, to some extent, also converts starch into sugar. It is alkaline, and in a slight degree dissolves and emulsifies fats; it is also supposed to act as a natural purge in the intestines, and to prevent decomposition by acting as an antiseptic.

The pancreatic juice (succus pancreaticus), like the bile, is alkaline; it converts starch into sugar to a much greater extent than does the saliva, and as in the gastric juice, so in this, a ferment (trypsin) exists, which has the power of converting albumen into peptones; it also splits up and emulsifies fats: both bile and pancreatic juice convert a small quantity of fat into soap.

Into the small bowels a secretion is poured, known as the intestinal juice (succus entericus) which, in a modified degree, assists the other juices mentioned.

In the large bowels, acidity replaces alkalinity and certain constituents of the food are rendered soluble and probably digested.

Some of the soluble matters of the food are absorbed partly from the stomach, but more largely from the intestines; the more important constituents are mainly taken up from the small intestines by the lacteals and the tributaries of the portal vein.

It is evident, from what has just been stated, that perfect and healthy digestion and the nourishment of the blood and the tissues depends entirely upon the perfect and healthy action of the important organs to which I have referred.

Fortunately, the salivary glands and the pancreas are rarely, practically I may say never, found diseased in the sheep. The stomach, being of very complex arrangement, is frequently deranged; and here I should observe that the three first compartments of the stomach of the sheep serve a useful purpose in assisting to break up (comminute) and to soften the food presented to them and thus prepare it for the more important process to which it is subjected in the true digestive stomach—the fourth.

It would be well for animals, as also for ourselves, if we could say the same of the liver as of the salivary glands and the pancreas; unfortunately, there is no gland in the body more subject to functional and organic derangement than this. I say unfortunately, not only on account of its secreting bile, but on account also of certain processes which go on in its interior and upon which the support of life depends.

In the liver, many of the constituents of the food—*e. g.*, the carbohydrates (not the fat) and, according to some authorities, the peptones, are converted into a substance known as *glycogen*, a sweet substance somewhat resembling sugar. Glycogen is supposed to be produced by the action of a ferment and to be stored up in the liver until required in the system, when it is reconverted into sugar and discharged into the circulation for the purposes of generating heat and muscular energy. Hence, the liver has been described as a "coal bunker" to the body.

In addition to this function, the liver *destroys the used-up red cells of the blood* and it is from their coloring matter that the coloring matter (pigment) of the bile, and also of the urine, is mainly obtained. Another important function served by the liver is to *prevent* the *entrance* of *injurious substances into the circulation*—to act, in other words, as a guard to the blood. Thus, the very substances upon which life is largely dependent, viz., the peptones, if taken from the intestines and injected directly into the blood would kill, but by passing through the liver they are not only rendered harmless but useful. In the intestines, peculiar poisonous substances (ptomaines) similar to those produced in the decomposition of animal flesh, and from which so many anatomists and others have lost their lives by inoculation in dissecting, are

constantly being formed; the liver seizes on these, as it were, and sends them back into the intestines, whence they are ultimately got rid of in the dung (fæces). Even that deadly poison with which Indians have for ages poisoned their arrows, known as curara-woorara, or the woorali poison, is harmless when swallowed; and this, it is believed, is due to the guardian function of the liver.

One substance of importance is found largely in the liver, and acts as a stimulant to it, viz., *iron*, and when it is given in overdoses, it is believed that the liver returns it to the intestines.

The cells of the liver after a meal contain large quantities of fatty matter, become infiltrated with it in fact, and if feeding on such matters is persisted in, fat takes the place of the normal tissue elements and the organ becomes practically a mass of fat—as seen in the liver (pate de foie gras) of Strasburg geese. *Fatty transformation means annihilation of all those important functions to which reference has been made.*

No bile is secreted, consequently it is lost for digestive purposes, for stimulating the activity of the intestines and for antiseptic purposes; and it is largely owing to the last fact that purgation takes place in the advanced stages of liver disease—arrest of the secretion of bile leading at the outset to constipation. The opposite condition of softening, *i. e.*, fibroid change, takes place from the action of continued irritation as in sheep and cattle by the fluke worm (in rot); and in man, by over-indulgence in spirits, the organ becomes hard, constituting "gin drinker's liver." Moreover, if the liver is not acting, poisonous matter is absorbed and produces its deleterious effects on the brain and nervous system generally, as well as upon the blood.

(*To be continued.*)

SNAKE BITE AND ITS ANTIDOTE.—1.

EXPERIMENTS WITH CROTALUS VENOM AND REPUTED ANTIDOTES, WITH NOTES ON THE SALIVA OF HELODERMA ("GILA MONSTER.")

By H. C. Yarrow, M.D., Curator Department Reptiles, U. S. National Museum.

(*From Forest and Stream*).

In 1664, Francisco Redi, an Italian, of whom Huxley says he was "a man of the widest knowledge and most versatile abilities, distinguished alike as a scholar, poet, physician and naturalist," published the first work extant upon the nature of serpent venom. It was called "Osservazione Intorno alle Vipera," and was printed at Florence.

In this rare book are corrected many of the popular superstitions and fallacies prevalent at that time. Although little was added to our actual knowledge of the properties of venom and its composition, still the author is entitled to the credit of having been the pioneer in this class of literature. From Redi's time up to the present day, a multitude of observers in this country and abroad have given to this subject much patient study and research, with a view to discover some means by which the suffering and deaths due to serpent venom might be averted.

In 1672 there was published in Paris a volume of 245 pages, by Moyse Charas, entitled "Nouvelles Expériences sur la Vipere," which contained a reply to certain strictures upon his work made by Redi, and it is interesting to note the many curious remedies suggested by this writer, who appears to have placed great faith in what he calls the "sel volatile de la vipere," a preparation made by distilling chopped-up vipers, old and young.

In 1702 Dr. Richard Mead—afterward physician to George II. in 1827—published an account of his investigations upon the subject of snake poisoning, which is interesting although not of much practical value.

From 1702 for sixty odd years nothing of consequence was published, but in 1767 at Lucca appeared the great work of Felix Fontana, entitled "Richerche Filosofiche Sopra il Veneno della

Vipera," a work so important that it has been translated into several languages. As an example of the amount of work done by this industrious and learned Italian, it may be mentioned that he performed over 6,000 experiments, employed over 3,000 vipers, and had bitten more than 4,000 animals. His most important discoveries were, first, with regard to the actual position of the poison gland, which is above and behind the fang, Mead and James having declared that the venom was contained in the fang sheath; second, that the venom of a viper was not hurtful to the reptile itself if injected beneath the skin, or if a bite was inflicted hy one of its own species; third, that venom was harmless to cold-blooded animals, such as leeches, slugs, snails, and some harmless serpents; fourth, that viper venom is poisonous to all warm-blooded animals; and fifth, that venom was not absorbed by mucous membranes. It is interesting to note that the conclusions of this distinguished naturalist have been verified repeatedly by later observers.

In 1777 M. Sage, of the Academy of Sciences at Paris, published a pamphlet recommending the use of ammonia in snake bite, which plan of treatment, however, was not original with himself, as it had already been recommended by Jussieu. It was based upon the theory that the active principle of the venom was an acid salt, but Fontana, who later on performed a number of experiments with it, condemned ammonia as useless, if not hurtful. With regard to the acidity of venom, Mr. Vincent Richards states that first it is acid, but soon becomes neutral, and this fact has been verified by the writer.

In 1796 Dr. Patrick Russell studied the subject of serpent poisoning, and the results are embodied in a book which was published by the Court of Directors of the East India Company. He performed a number of experiments with Indian serpents, and brought into notice the famous Tanjore pill, the principal ingredient of which is arsenic, in which, it may be added, he seems to place but little reliance, as he recommends in addition either immediate amputation or the ligature. Dr. Russell, it is claimed, was the first to show the error of the popular belief that the mungoose is proof against the venom of the cobra. It is true

that if this little animal is left alone with a cobra, he is invariably victorious, but if bitten by the snake he inevitably succumbs. It is a curious fact, vouched for by Mr. Vincent Richards, that after the conflict the victorious mungoose gnaws out the cobra's fangs. Dr. Russell's book is interesting as marking some onward progress in the study of venom, but it can hardly be considered as a very valuable contribution to knowledge.

In 1799 a Mr. Boag, in studying methods of treatment in snake poisoning, advocated the use of nitrate of silver and nitric acid baths, as well as the salts of mercury, but curiously enough, he seems to place great reliance in human saliva as an antidote, probably because it was recommended by Seneca and the elder Pliny. Arsenic he unhesitatingly condemns as being as dangerous as the venom. He believed that death after snake bite resulted from an abstraction of oxygen from the blood, and to overcome this he proposed a speedy oxygenation of the system by artificial respiration, and other methods of procedure. This gentleman made a number of experiments to prove his theory, all of which were unsuccessful.

In 1801 Mr. John Williams advocated the claims of ammonia as an antidote, and gave a history of several cases, which he believed had been saved by this agent, and, in 1809, Dr. Macrae, who was bitten by a cobra, stated that his recovery was due to thirteen spoonfuls of ammonia which he swallowed.

Mr. Breton, in 1825, published the results of a series of experiments with serpent venom, but he was evidently mistaken in his statement that "an innoxious snake can be killed by the venom of a poisonous snake."

In Vol. II., 1826, of the "Medical and Physical Transactions of the Calcutta Society" may be found an article by Dr. Daniel Butler on snake bite, in which he recommends the administration of opium, brandy and sulphuric ether in cobra poisoning, his treatment being founded upon the theory that the heart and arterial system are principally affected, an hypothesis now known to be untenable, as we know that the principal action of cobra poison is upon the respiratory centres. He also recommends the use of the ligature, dry cupping and suction of the wounds, and gives the history of several cases.

Dr. Davy, in 1839, published an account of some experiments with the poisonous snakes of Ceylon, but his studies possess little, if any, practical value.

From this period until 1860 nothing of importance was published regarding antidotes to serpent venom, although it should be mentioned that various papers on the subject of reptiles and their venom had been published from time to time by such observers as Dr. Barton, Mangili, Prince Lucien Bonaparte, Bernard Gratiolet and others. Brainard and Green recorded their researches in 1853, the former publishing a separate essay in 1854.

In 1860 the Smithsonian Institution accepted for publication a work which has become classic, and which appeared in January, 1861. It was entitled "Researches upon the Venom of the Rattlesnake, with an Investigation of the Anatomy and Physiology of the Organs Concerned," by S. Weir Mitchell, M.D.; and this quarto of 117 pages has done more to advance our positive knowledge of crotalus venom than any previous publication. The conclusion reached by Dr. Mitchell, as a result of his studies so far as antidotes were concerned, was that none of those in reports were reliable. About the same time that the work already mentioned was passing through the press, a paper by the same author, entitled "On the Treatment of Rattlesnake Bite, with Experimental Criticisms upon the Various Remedies now in Use," appeared in the *North American Medico-Chirurgical Review*, 1861, V., 269, and gave the results of numerous experiments with so-called antidotes, and in summing up the author recommends no special plan of treatment, but advises the ligature, or excision, or both, with the administration of stimulants; in short, the general symptoms are to be treated according to the indications.

Another essay by the same author appeared in the *New York Medical Journal*, 1868, entitled "Experimental Contributions to the Toxicology of Rattlesnake Venom," and in this Dr. Mitchell corrected some of his views published in previous papers.

Following the essays of Mitchell in 1872 came the magnificent folio work of Dr. Joseph Fayrer, of Calcutta, entitled "The

Thanatophidia of India," being a description of the venomous snakes of the Indian peninsula, with an account of the influence of their poison and life, and a series of experiments, London, 1872. This work, beautifully illustrated with thirty-one imperial folio plates drawn from life by native artists, is a veritable monument of patient research, and a most valuable contribution to our knowledge of the effect of the venom of the different poisonous snakes with which India is so abundantly supplied. Unfortunately, so far as mitigating the loss of human life is concerned, the author is obliged to admit that no plan of treatment can be absolutely relied upon, as he tested every known or asserted antidote. In treating a case of serpent bite he would employ ligature, excision, and general treatment.

A number of other papers have appeared from time to time, all more or less valuable, by such well-known authors as Dr. Shortt of India, Harford of Australia, Brunton and Frayer, Vincent Richards, and others, but in none of them is an account of any discovery of a physiological or chemical antidote to serpent venom, once it is diffused through the circulation.

In 1881, however, Dr. J. B. de Lacerda, director of the physiological laboratory of the National Museum of Rio de Janeiro, electrified the scientific world by announcing to the French Academy of Sciences that he had discovered in potassa permanganas an absolutely reliable chemical antidote to the venom of the bothrops, a poisonous South American genus of serpents. In the experiments which were made upon dogs, the venom dissolved in water was injected beneath the animal's leg, and in from one to two minutes afterward a one per cent. solution of permanganate of potassa was thrown into the wound made by the syringe. In other cases the permanganate solution was thrown directly into a vein, and out of thirty cases only two of the animals succumbed to the effects of the bothrops venom. In some instances the permanganate was not employed until the characteristic symptoms of poison manifested themselves. He formally expressed himself that in this salt we possess an absolutely reliable chemical antidote.

It was not to be supposed that such astonishing results could

be accepted without further experiments by various persons, and in 1882 Dr. G. Badolini, of Bologna, repeated Lacerda's experiments and signally failed. Mr. Vincent Richards, of Calcutta, who had been a member of the Snake Poison Commission in India, having learned of de Lacerda's studies, at once instituted a series of experiments to verify if possible the statements made, publishing his conclusions in the *Indian Medical Gazette*, Calcutta, XVII., I., 57, 85. He is of opinion that the salt is not, strictly speaking, an antidote, but that it may prove of service in neutralizing the venom while in the tissues, but is of no service if the poison has been absorbed into the general circulation. In his over one hundred experiments he used solution of cobra poison and permanganate solution varying in strength, and from his well-known careful method of working, great reliance may be placed in his statements. His remarks in summing up will be given further on.

Theodore Aron, one of Prof. Binz's assistants at the University of Bonn, also experimented in 1882 with the permanganate as an antidote to cobra poison, publishing his results in the *Centralblatt für Klinische Medizin*, Bonn, 1882, No. 31, Nov. 18, and states that he saved some animals by its uses, but he seems to attach much more value to the use of a solution of chloride of calcium, for out of twenty-two experiments with this salt he saved seventeen of the rabbits which had been inoculated with the venom. He also used alcohol, caffeine, atropine and bromine as antidotes, but all failed.

In April, 1882, Dr. Couty, who had assisted Dr. de Lacerda with his experiments in Brazil, sent a communication to the Academy of Sciences of Paris, in which he stated that, after having made experiments himself, he was obliged to conclude that the permanganate had no antidotal effect upon serpent venom; when in the circulation all of the animals inoculated died. De Lacerda, in answering the statement of his former colleague, mentions that a rupture of friendly relations had taken place between himself and Dr. Couty, and explains why the latter had failed, when he himself had almost invariably succeeded. Space will not permit of this being repeated here.

It is but fair to state in connection with the credit given to de Lacerda that Dr. Armand Gautin of Paris, about the same period, in experiments with cobra and rattlesnake poison, came to the conclusion that a solution of caustic potassa acted as an antidote to the venom, and his memoir was read before the Academy of Medicine, July 26, 1881.

In 1884 Dr. de Lacerda published in Rio de Janeiro an 8vo. volume of 200 pages, entitled "Leçons sur le Venin des Serpents du Brésil et sur la Méthode de Traitement des Morsures Venimeuses par le Permanganate de Potasse," in which he reiterates his opinion regarding the antidotal value of the permanganate, and states that his discovery is "a veritable scientific and humanitarian conquest of which the happy results have been verified a thousand times, not only in Brazil, but throughout the world." In closing he says: "It is not for my country alone that I have written these pages, for I hope they will be read in many parts of the globe. It is for this that I appeal to the competent men of all countries, begging them to correct any faults or errors I may have made, and to fill up the gaps that may exist in this book." The writer would state that these few sentences of Dr. de Lacerda instigated him to perform the experiments which will be given hereafter.

Much attention, of late years, has been attracted, especially in the British colonies, to the so-called discovery by Dr. George B. Halford of liq. ammonia as an antidote to serpent venom, and while the intravenous injection of this liquid may have originated with him, the substance is one which has been repeatedly tried and failed, even so far back as the time of Fontana. Halford's theory appealed so strongly to the popular mind that in Melbourne, Australia, hundreds of hypodermic syringes were sold to the settlers, who fully believed they held in their hands an absolute antidote to the bites of venomous serpents. Sir Joseph Fayrer and numerous observers have found it entirely useless in cobra poisoning, and Mitchell states that as a stimulant it is far inferior to alcohol.

It is only fair to Dr. Halford to state that he reports a number of apparently authentic cases of snake bite in which the patients

recovered after ammonia had been injected into the veins. The writer may add that in his experiments with the liquor ammonia the results were astonishingly disastrous. These experiments will be related in another part of this paper.

The action of the venom of the copperhead (Ancistrodon contortrix) has been studied in 1883 by Dr. Isaac Ott, of Easton, Pa., and finally has appeared the magnificent study of venoms by Dr. S. Weir Mitchell and Dr. Edward T. Reichert, published as one of the "Smithsonian Contributions to Knowledge." So far as the writer knows, with the exception of a few unimportant papers, the subject of serpent poisoning and antidotes has in this review been brought up to date.

(*To be continued*).

AMERICAN VETERINARY COLLEGE.
HOSPITAL DEPARTMENT.

FATAL FRACTURE OF A SMALL METATARSAL BONE—SUPPURATIVE SYNOVITIS.

By M. W. Trisohler, D.V.S., House Surgeon.

The patient was a chestnut gelding about nine years of age, used for light road purposes.

History.—While being led out to the watering trough on the evening of the 2d of June he was kicked by another horse on the off hind leg, in the region of the hock; following the infliction of the injury no lameness whatever was manifested until several hours had elapsed. The precaution was taken to prevent the animal from lying down, and a cold water bandage applied during the night.

When seen the following morning a superficial abrasion was noticed upon the superior extremity of the metatarsus and upon its postero-external aspect; but very little swelling about the point and some local heat; lameness, however, was excessive, the animal simply resting lightly upon its toe; crepitation could not be determined. Diagnosis withheld; fracture suspected; the animal placed in slings and an opium and lead solution prescribed.

Upon the second day lameness was, if anything, slightly increased; the parts somewhat swollen and a deep-seated fluctuation detected at the point of the injury.

The day following, what was at first only a slight wound had become transformed into a track leading directly down upon the small metatarsal bone, with evidence of that most formidable of complications, an open joint, as shown by a slight escape of synovial fluid. The bone gave a grating sensation upon the introduction of the probe, and appeared also slightly movable.

From now on the severity of the symptoms continued to increase day by day; pain became constant and lancinating in character, the animal keeping the limb in constant motion; the hock became greatly swollen; heat manifested over its entire extent, the discharge of synovial fluid becoming mixed with pus of a sanious nature; appetite began gradually to fail, with rapid emaciation; temperature varying between 102° and 103°.

In view of the condition of the animal generally and the extent and character of the lesions locally, the owner finally consented to have him destroyed, which was accordingly done on the 19th of June.

Autopsy revealed a general synovitis of the entire hock, the membrane being greatly thickened, the sac distended with synovial fluid and a small quantity of pus. The connective tissue beneath the skin was infiltrated with serum and a plastic exudate which had become organized. The superior extremity of the external rudimentary metatarsal bone was fractured in a manner so as to form six or seven separate pieces of as many different sizes; they being held, however, in perfect apposition, the entire mass being surrounded by extravasated blood. The periosteum about the seat of the fracture was also concerned, in many places being an eighth of an inch in thickness.

There existed no evidence of any reparative calus directly at the seat of the fracture, but the superior extremity of the large metatarsal and the lower row of tarsal bones showed an abundance of osseous deposits.

NEW GROWTH OF A MELANOTIC TUMOR IN A BAY HORSE—AMPUTATION OF THE TAIL.

By G. A. Lathrop, D.V.S., House Surgeon.

A bay gelding, 15.1 hands, 18 years of age, was brought to the free clinic September 26th, 1887, suffering with a melanotic tumor of the tail, two and one-half inches in diameter. The owner was advised to have it extirpated, to which he consented. The tumor was removed and the patient discharged in a convalescing condition, with hopes at the time of a permanent recovery, but a guarded prognosis was given at the time and a report given of the same in the November number of the Review in 1887.

About seven months later, May 5th, 1888, the same horse was brought to the free clinic again by another party—he having changed owners in the meantime—to be treated for the same affection.

Upon examination, a large growth, 14 inches in circumference and 8 inches in diameter, situated at the same seat of the previous tumor, was found. There was also another small growth underneath the tail and nearer the base. Ulceration had taken place on the surface of the larger growth, rendering the case still more complicated, with less chance for a recovery, and as amputation of the tail was the only means by which a recovery might take place, an unfavorable prognosis was given; but the owner was advised to have it operated upon, to which he consented, and accordingly the horse was cast and an elastic bandage applied around the tail above the growth, to control the hemorrhage. The tail was then amputated two inches above the tumor, by a single incision, and the end of the stump severely cauterized by the actual cautery, to control the hemorrhage and also to destroy any melanotic growths that might be present.

Was seen again May 16th; wound was doing nicely; a large scab had formed, and very little suppuration was present.

Was seen again June 6th; scab had come off, wound was granulating nicely and of a very healthy nature; was cauterized slightly with chloride of zinc solution; has not been seen since.

What the result will be, time only will tell. It was feared at the time of the operation that another growth would make its appearance at the end of the stump, but no signs of such were apparent when last seen.

This case is not reported to simply describe the operation, for that in itself was very simple, but to show that we can never be too careful in our prognosis when about to operate upon growths of this nature.

EXPERIMENTAL PATHOLOGY.

THE BLOOD DESTROYS BACTERIAS.

By Fodor.

The author injected cultures of anthrax bacterias into the jugular vein of a rabbit, and having killed the animal, used the blood from the heart in the preparation of other cultures. He obtained only negative results, as in about one minute the bacterias had already entirely disappeared from the blood.

He then placed the blood taken from the heart of a rabbit, immediately after death, in a large test tube, which he kept at a temperature of 38°, and added to it ten drops of an anthrax culture. Ten minutes later the tube contained a liquid which gave cultures extremely rich in bacterias; in thirty minutes the blood had already lost a portion of its properties, and after the lapse of an hour or two the cultures produced became poorer and poorer. On the contrary, gelatine, inoculated at the same time with the blood, and with the same anthrax bacilli, at the same temperature of 38°, preserved its power of reproduction uniformly for two hours.

The blood taken in a fresh state had thus destroyed, not indeed all the anthrax bacilli, but a large portion of them. This destructive power, however, has only a limited continuance, and if a lapse of eight days be allowed before the examination, the result will be the production of an enormous mass of bacilli and spores.

The destructive effect of fresh blood upon the anthrax bacilli

is thus demonstrated to be an established property of that fluid.

No traces of the destroyed bacilli can be found in the elements of the blood, in either the red or the white corpuscles.—*Deutsch Med. Woch.*

OF THE POWER OF MICROBES TO ACCOMMODATE THEMSELVES TO ANTISEPTIC MEDIA.

By G. Kossiakoff.

The subjects of the experiments which produced the results which are here referred to, are the anthrax bacteridæ, the tyrothrix scaber, bacillus subtilis, and tyrothrix tenuis—the antiseptic media employed in the tests being solutions of borax, boracic acid and corrosive sublimate. The following conclusions are held to be justified:

Low organisms may be "acclimated" by exposure to the action of an antiseptic solution in doses gradually increased, and when thus acclimated they may acquire the faculty of living and growing in the same solution which in the absence of the process of acclimatization would prevent their development. But this power or faculty of resistance or accommodation varies in different micro-organisms.

The numbers stated as measuring the power of accommodation, and fixing the limit beyond which the growth of the microbes cannot be sustained, cannot be considered as fixing the maximum rule within the same conditions as those under which the experiments were originally made, since they do not prove that, in other conditions more favorable to their acclimatization, the micro-organisms might not be able to offer still more effectual resistance to the action of antiseptics.—*Annales de Pasteur.*

A NEW GASIFORM BACILLUS—A HUMAN PARASITE.

By Arloing.

The author has examined the reddish, sanious liquid, mixed with sundry gases, obtained through the puncture of a wounded eye. The patient seemed to be free from any general disturbance, and the enucleation of the eye was perfectly successful.

Arloing expected to find the bacillus septicus, but found only fine bacilli of varying dimensions, some being isolated and some in masses, without spores, and differing from the bacillus of gaseous septicæmia by its mode of development. Inoculation with the fluid obtained is fatal to rats and guinea-pigs, but is without effect on rabbits and dogs. Cultures in bouillon and gelatine are formed, both in the presence and the absence of air, and in its growth the bacillus assumes the form of little tufts. It does not produce the fermentation of albuminoids.—*Revue des Sciences Med.*

EXTRACTS FROM FOREIGN JOURNALS.

APOPLECTIC CEREBRAL SHOCK IN A HORSE. RUPTURE OF THE RACHIDIAN BULB.

By M. L. Magnin.

A clinical lecture by Director Nocard, published as long ago as 1882, being almost the only recorded notice or accessible publication on this subject, the author has thought that the following further mention would be found to contain some points of more or less interest to the veterinarian reader.

A nervous horse, being quite severely punished while at work, broke loose and ran away, and after a run of about two hundred yards fell headlong, striking heavily against a wall, death being instantaneous. He was found lying in the left sterno-costal position, his legs bent under his body, and his head bend under the neck.

At the post mortem there were a few ecchymotic spots, principally on the left side. The external occipital protuberance on the left was loosened from the principal part of the body, but that was the only bony lesion found. No fracture could be detected. The encephalic mass was then carefully removed. The meninges were perfect, and there were no congestions, either externally or internally. Neither the cerebrum or the cerebellum offered anything peculiar.

The isthmus at first seemed normal, but careful examination

of the bulb exposed serious lesions at the superior face of the organ. On the antero-posterior median plane of the right certiform body, more outward than inward, there was a longitudinal laceration, beginning about the level of the calamus scriptorius and running slightly upwards, involving almost half the thickness of the bulb. The edges of the laceration were separated by a clot of blood; they were ragged and ecchymotic, and united at one point by a bridge or small band of nervous substance.

A similar lesion existed on the left corpora rectiforma, but was less extensive, and not so complete. It formed a small cavity and was filled with blood. It was situated nearer the inferior than the superior face.—*Rec. of Med. Vet.*

HEMORRHAGIC DIATHESIS IN THE HORSE.

By M. J. P. Thomassen.

After a short consideration of the etiology of hemorrhages, which he divides into *essential* and *secondary*, and a glance at the subdivision into *congenital* and *hereditary*, as admitted by authors, the writer refers to a few cases mentioned by Siedamgrotzky, Khone, Dieckerhoff, Frohner and others, and reports the following peculiar case, as one analogous to the "morbus maculosus Werlhofic," a human affection characterized by *interstitial* hemorrhages.

The subject of this report was a mare, eight years of age, which had recently had three attacks of epistaxis, and though she had lost but little blood had become weak and dull, and perspired readily. Her functions were all normal and she did not seem to suffer from severe sickness. Her looks were bright, her hairs glossy, and her condition satisfactory. The visible mucous membrane was pale and anæmic. No cause for the nasal hemorrhage could be found in the respiratory apparatus. Her temperature was normal, but respiration somewhat accelerated. The pulse was small, weak and rapid. Auscultation revealed above, in both sides, increased respiratory murmur, and below, loss of vesicular sound. Percussion showed complete dullness horizontally, as high as on a level with the scapulo-humeral joint. There

was evidently a great mass of liquid in the chest. Examination of the heart revealed nothing. Thoracentesis was performed, and was followed by the escape of three or four quarts of a dirty, red colored fluid. Counted microscopically, the red globules and the leucocytes were found in the proportion of one to twenty. The urine was reddish. The diagnosis being incomplete, a treatment of symptoms was directed, consisting of stimulant and tonic ferruginous preparations.

After six days of this treatment the mare died. At the post mortem, on removing the skin, the dependent portion of the chest and abdomen were found to be filled with serous infiltration, the abdomen containing a small quantity of bloody liquid. A few petechiæ were found on the peritoneum, some of which were under the renal and hepatic capsules, and others on the intestinal mucous membrane. The adipose tissue of the left kidney contained a large clot of blood. The ovaries were very large and contained a bloody deposit. The thorax was nearly filled with a bloody liquid. The costal pleura was covered with petechiæ, the pulmonary portion containing bloody extravasations of various sizes. The pulmonary tissue contained hemorrhagic foci, and a certain amount of blood was found in the pericardium. The nasal mucous membrane under the dura mater in the cerebral substance contained small hemorrhagic spots. The cause of death was evidently anæmia, resulting from the repeated internal hemorrhagic attacks, and asphyxia, produced by the large bloody effusion in the pleura.—*Annales de Belgique.*

RABIES AND PSEUDO-RABIES IN THE DOG.

By Mr. F. Hendrickx.

The diagnosis of dumb-rabies being ordinarily determined by the presence of several symptoms, and sometimes even of one alone, (the paralysis of the lower jaw), which is common to several affections, it may easily happen that it is entirely erroneous, or at least of a very doubtful character.

A bitch had for three days presented some very peculiar symptoms. Her habits were quite changed and she became dull

and quiet, and constantly lying down in her basket. Although ordinarily noisy and active, barking frequently, she had partially lost her voice, which easily failed. She chewed bones with difficulty, but still readily masticated soft food, and at a later period refused to drink. Previous to the appearance of these symptoms she had been covered, but without results, and yet, nine weeks later, her mammæ became large and full of milk, and she nursed and raised a puppy taken from the litter of another bitch. Her mouth, however, soon became paralyzed and her tongue pendent. Placed under observation, in consequences of a suspicion of dumb rabies, it was then that these symptoms were noted. She was somewhat constipated; made no attempts to tear or to bite, and remained indifferent to the presence of other dogs. Nothing appeared from a careful examination of the mouth and throat that served to explain the existing conditions. She remained in that state for four days, when she seemed to improve. She recovered her good spirits and began to drink and to take notice. She again recognized her master, and after a few days was sent home in perfect health.

Now comes the interesting question, what was the true nature of this paralysis of the jaw; was it rabies, and did the animal recover, or was it some anomalous affection of unknown nature, which gave rise to these pseudo-rabiform symptoms, as they are commonly met with?—*Ibid.*

SYMPTOMATIC PECULIARITIES IN A CASE OF RABIES, DEVELOPED BY INTRA-CRANIAN INOCULATION.

By the Same.

The body of a dog, destroyed because of suspicion of rabies, was submitted to the author for confirmation of diagnosis. The animal had manifested symptoms of an alarming and suspicious character, had bitten several dogs, and torn and eaten the boards of his kennel. On the post-mortem no special lesion was found, except a certain quantity of foreign bodies in the stomach, and although the history of the case and the lesions discovered might have justified a positive diagnosis of rabies, inoculation of another

day was decided upon to confirm the fact. A street dog was trephined, and about one-third of a syringe of Pravaz filled with a filtered solution of a portion of the rachidian bulb of the suspected animal in some distilled water, was introduced under the dura mater. The operation seemed to disturb him but little, and the wound healed in a few days.

Instead of showing any bad symptoms between the twelfth and sixteen days, as it is usually the case in this experiment, it was not until the twentieth that he appeared to be sick. He then refused his food, and for the three following days showed all the symptoms of rabies, being in state of continued agitation, moving constantly about his kennel, tearing his bedding and biting the sides of his cage. His looks and his voice were altered, and he bit furiously at a piece of stick presented to him; it was, in fact, rabies, which it was expected would kill him on or about the fifth day, the fatal termination in rabies generally taking place between the first day and the eighth from the manifestation of the first symptom. This dog, on the fifth day was better, his symptoms having improved, and his nervous irritation diminished, and in about five days more he was apparently so completely recovered that his radical return to health was confidently looked for when, to the surprise of all, he was a couple of days after found dead. Unfortunately, no post-mortem examination was made. If this dog died from rabies, two important points are to be observed in connection with the experiment. These are, the duration of the incubation of the disease thus inoculated, and the other is the length of time that elapsed before death took place.—*Ibid.*

FATAL PERITONITIS FOLLOWING THE ACCOUPLEMENT IN A COW.

By M. Duranton.

The act of copulation in cattle varies in some respects from that of other mammalia, because of the possibility of the introduction of the organ of the male directly into the uterus. In this case this peculiar accident took place, and the violent action of the male caused a laceration of the left horn of the uterus. Several days after she had been served, this cow became sick, and

exhibited a series of symptoms which brought the author to the conclusion that she was suffering with acute peritonitis. She was sold to the butcher and destroyed, and besides an extensive and general inflammation of the peritoneum, with a bloody effusion in its cavity, the injury of the left horn of the uterus was exposed, partly closed by a large clot of blood.—*Journal of Zoötechnie.*

PARAPLEGIA IN THE HORSE.

By Mr. Ripert.

Any form of treatment that is followed by good results is comparatively justifiable, and the novelty of an application may sometimes form its best recommendation to a trial. This is partly demonstrated by the history of the following case, in which an attack of paraplegia gave way in a very short time to the hydrotherapic treatment of cold douches. A four-year-old horse was taken suddenly while at work with loss of power of the hinder extremities. The amputation of the tail, which produced a general bleeding, with stimulating drenches, purgatives, injections and strong frictions, all failed to give relief. Fearing a fatal result, the author then had recourse to the application of cold water douches over the loins, and in fifteen minutes there was a well-marked return of sensibility to the parts. This, after drying the skin with brisk friction, was followed by a subcutaneous injection of a solution of strychnia, and in *three minutes* the animal rose to his feet and micturated a *viscous, strongly odorous and bloody urine*, and from that moment was entirely relieved.—*Ibid.*

[Was this a true case of paraplegia?—Ed.]

TREATMENT OF SEPTIC METRITIS BY UTERINE IRRIGATIONS.

By the Same.

"In mares and bitches, the putrefaction of the after-birth is followed rapidly by puerperal septicemia, but in cows it gives rise only to a simple septic fever, which disappears upon the removal of the offending substance from the uterus. If, however, that organ is torn or injured, rachitis and septicemia soon appear."

Upon this theory, that puerperal metro-peritonitis is always of septic origin, the author recommends the irrigations patronized by Franck and Haubner.

The injections are made with a long irrigator, introduced into the uterus, and between twenty-five and thirty quarts of water are allowed to wash the whole cavity. The irrigations are made at least once, and if the putrefaction is extensive, twice a day, the condition of the vaginal discharge, the temperature and general condition of the patient, furnishing, in fact, the indications to be carried into effect.

The solution employed in preference is that of corrosive sublimate, 1 part in 1,000. A sufficient number of observations have proved this to be a perfectly harmless formula and one that can be used without fear of mercurial poisoning. Besides its septic effect, the solution has a property of stimulating the contraction of the uterus, and thus facilitating the expulsion of the putrid elements.

CONTRIBUTION TO THE TREATMENT OF TETANUS.

By M. A. Trinchera.

After mentioning all the recent works which have established the infectious origin of tetanus and considered the poor results obtained by many of the various treatments recommended, the author mentions the experiments he has made in the line of treatment and suggests the use of salicylate of quinine, in tracheal injections. The formula is:

Salicylate of quinine, 6 parts.
Salicylic acid, 3 "
Distilled water,
Absolute alcohol, aa. 75 "

This is a dose for one tracheal injection, made in the evening. The treatment can be followed during five or ten days. A rapid recovery was obtained in two cases of traumatic and one of chronic tetanus.—*Clinica Veterinaria.*

THE CAUSE OF DISLOCATION OF THE PATELLA.

By M. V. Lari.

That this condition is due to the fact that the patella is caught on the superior extremity of the femoral trochlea, has been proved long ago by Italian and French observers. The author had remarked that in the dislocation, the patella was often carried upwards and slightly inwards. To satisfy himself of the changes that might exist, he experimented on cadavers. Artificially he produced the dislocation upon three horses, and then dissected the leg. In all the cases he found that the femorotibial joint was in extreme extension, the patella was carried upwards but not inwards, and tightly bound to the femoral trochlea. The internal and middle patellar ligaments were in full stretch, and the patella caught by the superior extremity of the trochlea on its inner border.

The post-mortem of a mule affected with an old luxation revealed the same alterations.—*L'Ercolani.*

COMMENCEMENT EXERCISES.

PENNSYLVANIA UNIVERSITY VETERINARY DEPARTMENT.

The one hundred and thirty-second commencement of the University of Pennsylvania and the second of the Veterinary Department were held at the Academy of Music in Philadelphia on the 6th of June ult. The degree of "Veterinariæ Medicinæ Doctor" (V. M. D.) was granted to the following gentlemen. The class matriculated twenty-eight names at the opening of the session in 1885, and was augmented later by two members of the preceding class:

Bachman, B. Frank	Pennsylvania.
Balzer, Helmuth C	Connecticut.
Breisacher, L. W., Jr	Michigan.
Felton, Howard B	Pennsylvania.
Formad, Robert	Pennsylvania.
Garrett, Caspar	Pennsylvania.
Hartman, Guldin R	Pennsylvania.

Lusson, Louis O.....	...Pennsylvania.
Maurise, Antoni.....	...Pennsylvania.
Reefer, Leon R.....	...Pennsylvania.
Ridge, Wm. H.....	...Pennsylvania.
Schreeber, Albert F.....	...Pennsylvania.
Tintsman, John Z..	...Pennsylvania.
Werntz, William B.....	...Pennsylvania.

NEWS AND SUNDRIES.

A CURE FOR ROARING IN HORSES.—The announcement has been made of the discovery by the celebrated English veterinarian, Dr. Fleming, of a mode of curing the vice of roaring in the horse by an operation upon the larynx. A number of cases are reported, though we have not as yet received a circumstantial account of them. The *Live Stock Journal* (London) refers to them in a manner which implies a favorable opinion of the success of the method, but thinks it would be premature to pronounce absolutely at this time.

Dr. Fleming himself, in a note to the *Journal*, speaks on this wise:

"Yesterday (June 4th) the veterinary surgeon at Woolwich who is in charge of the cases, reported that the horse operated on at the same time as the one already announced as cured, was perfectly well. The animal had been galloped for a long time and made no noise, neither did it exhibit the least distress. Both the cases were so bad that they could not go many yards without making a startling noise and stopping for want of breath. A third horse was operated on a week ago, but we have not had it out of the stable yet. The operation gives promise of being successful, as, indeed, I predicted it would from my previous study of the disease—anatomically and pathologically. There is, unfortunately, ample scope for the operation, even among army horses, and we shall soon have a number under treatment. Then we will be able to arrive at a definite conclusion. For the present we can say that so far the operation has been a complete success,

and in some other points it has yielded most important results from a surgical point of view.

Borofuchsin as a Stain for Tubercle Bacilli.—Professor Lubimoff describes in the *Meditsinskoe Obozrenie* a new stain for tubercle bacilli, which he calls borofuchsin. It consists of: Fuchsin, 0.5 gramme; boric acid, 0.5 gramme; absolute alcohol, 15 grammes; distilled water, 20 grammes. Prepared thus, it has a slightly acid reaction; it is quite clear and not liable to spoil by being kept, and is consequently always ready for use. The sputum is dried on a cover glass, and stained by being heated in contact with the borofuchsin for one or two minutes. The stain is then washed out by treatment with dilute sulphuric acid. The specimen is then washed with alcohol, and subsequently immersed for half a minute in a saturated alcoholic solution of methylene blue. After being washed in distilled water and dried, the examination of the specimen is made in oil of cedar or in a solution of Canada balsam. In exactly the same way sections of tuberculous organs may be stained after hardening in spirit, only in such cases the steps of the operation must be somewhat more prolonged. The main difference between this and other staining processes for Koch's bacilli is that, when borofuchsin is used, the process of washing it out with sulphuric acid is an almost instantaneous one. All other bacilli are, as when other stains are used, rendered colorless and invisible, the tubercle bacilli being alone seen.—*Lancet.*

Dr. Frank S. Billings and His Work.—It is stated that Dr. Billings, the accomplished head of the patho-biological laboratory of the State University of Nebraska, has found it necessary to relinquish his labors in that institution, by reason of the insufficiency of the means at his disposal for profitably and properly carrying forward the enterprise. Not only has there been a lack of means to meet necessary expenses, but ceaseless interferences with his work are alleged, such as must always prove most irksome and discouraging to a sensitive and zealous investigator. The practical study by clinical methods of the diseases of our live stock is an undertaking that will well reward any expenditure likely to be incurred in its prosecution, and that should com-

mand co-operation and countenance on every hand, as of large interest to the entire community.

One result of this miscarriage is to leave Dr. Billings at liberty to accept an invitation from any institution or station, or other parties interested or engaged in investigating pathological subjects of the nature in question, and we need not say that we would be truly gratified to learn that the Doctor had found the place and the place had found the man for the full, satisfactory, uninterrupted and successful prosecution of the experiments and discoveries hitherto pursued by him.